

THE ICHTHYOFAUNAL DIVERSITY IN THE FRESHWATER RIVERS OF SOUTH DINAJPUR DISTRICT OF WEST BENGAL, INDIA

TATHAGATA CHAKRABORTY¹ AND SOUMEN BHATTACHARJEE²

¹Department of Zoology, Balurghat College, P.O. Balurghat, District South Dinajpur 733 101, West Bengal, India.

Email: tchakravartty@gmail.com

²Department of Zoology, University of North Bengal, P.O. North Bengal University, Raja Rammohunpur, Dt. Darjeeling 734 013, West Bengal, India. Email: soumenb123@rediffmail.com

A steady decline in fish catch per year through the past decades, and selective decline of certain prized small table fishes in the rivers of the district have not been addressed so far. This study, therefore, aims to estimate the present status of the annual fish catch of South Dinajpur district, West Bengal, with reference to the species composition of the rivers and *kharis* during pre-monsoon, monsoon and post-monsoon seasons. In this two-year long survey, we have identified 5 orders, 6 suborders, 17 families, 11 subfamilies, 40 genera and 49 fish species and a few rarely caught species from the rivers, *kharis* and *beels* of the district.

Key words: riverine ichthyofaunal diversity, South Dinajpur, species composition

INTRODUCTION

The aqua resources of India include 2.02 million sq. km of an Exclusive Economic Zone (EEZ) of surrounding seas, approximately 29,000 km length of rivers, c. 1,13,000 km of canals, c. 1.75 million ha of existing water-spread in the form of reservoirs, c. 1 million ha in the form of tanks and ponds, and c. 0.6 million ha of stagnant, derelict, swampy waterspread areas (Jhingran 1991). About 2,200 fin fish species have been recorded from different ecosystems of India, which is 11% of the world fish germplasm (Sinha 1998). Of these, 400 species are commercially important. These include cultured, cultivable and wild species. The ecosystem-wise distribution of fish germplasm resources of India are: cold water (73; 3.3%), warm waters of the plains (544; 24.73%), brackish water (143; 6.50%) and marine water (1440; 65.45%) (Anon 1992-93; Das 1994).

This study aims to estimate the species composition of the rivers, *kharis*, *khals* and *beels* of South Dinajpur district, West Bengal. The South Dinajpur district forms a part of the erstwhile undivided West Dinajpur, created out of the Dinajpur district in 1947 at the time of partition of India. It was then split into two districts in 1992 – one being Dakshin or South Dinajpur and the other Uttar or North Dinajpur (Table 1; Fig. 1).

The district has four north to south flowing major rivers, namely Atrai, Punarbhaba, Tangon and Jamuna. Atrai and Punarbhaba originate in India, at the foothills of the Himalayas and pass through Bangladesh to enter India again in South Dinajpur. These rivers have connections with Teesta drainage system, especially during the monsoon. Besides these rivers, there are a number of drainage channels, locally known as *kharis*, *khals*, or *beels* (Tables 2, 3, 4 and 5). The relevant details of resources available for development of fisheries in the district are shown in the Table 6 (Rao 2001). Almost all the

rivers and streams enter the district from Bangladesh and leave the district to enter again to either Bangladesh or a neighbouring district. However, many rivers originate from other major river systems north of Bangladesh, and also from India.

The productivity of the cultured fish is less than 2 tons per hectare per year in the district, which can be enhanced considerably with the help of scientific extension programmes (Rao 2001). However, there is no concrete data regarding the status of fish catch from the open water bodies. A steady decline in fish catch per year through the past decades, and selective decline in the catch of certain prized, small table fishes in the rivers of the district have not been addressed so far. Therefore, the present study aims towards estimating the present status of the annual fish catch in capture fisheries of the district with reference to the species composition of the rivers and *kharis* during pre-monsoon, monsoon and post-monsoon seasons. To the best of our knowledge, no such study with regard to cataloguing the fish species has been undertaken prior to this study in this district. Therefore, this study gives an idea regarding the ichthyo-biodiversity status of the endemic fish stocks of the district. Two potential breeding grounds were also identified, namely the Danga *Beel*, near Balurghat aerodrome and Gochina *Beel*, near Trimohini, Hili block.

List of abbreviations used in text:

EEZ - Exclusive Economic Zone

ZSI - Zoological Survey of India

METHODOLOGY

Surveys in different rivers and *kharis* of the district

A two-year survey (2004-2006) was undertaken in major rivers, like Atrai, Punarbhaba, Tangon, Jamuna, in minor rivers,

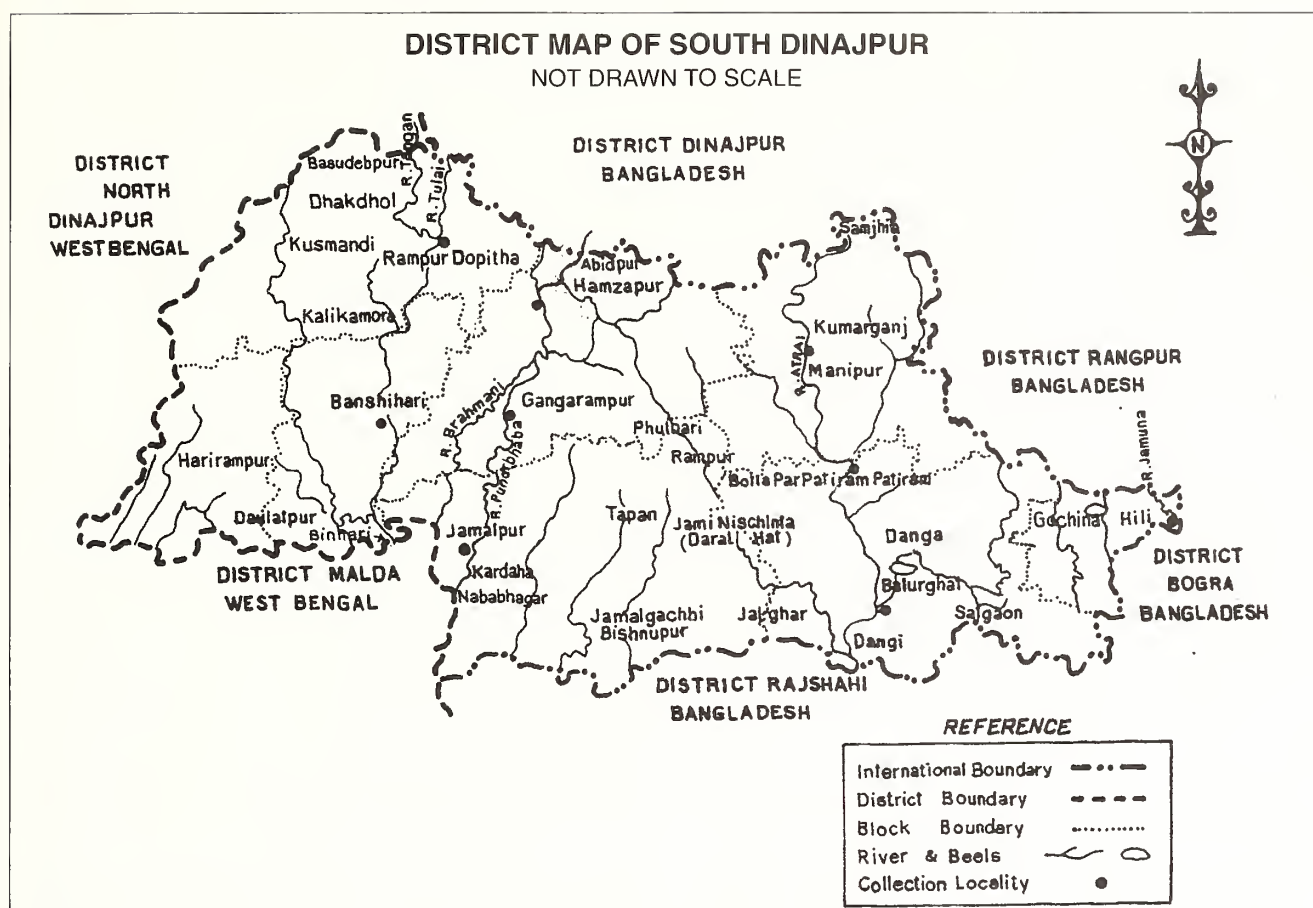


Fig. 1: District map of South Dinajpur, West Bengal. Map shows district blocks, major and minor rivers and adjoining districts of Bangladesh besides, two *Beels* namely, Danga and Gochina. Fish sample collection stations are marked as filled circles by the side of each major river (Map not drawn to scale)

like Ichhamoti, and in *kharis* like, Kalkali, Kashiani and Brahmani. *Beels* visited were Danga and Gochina. Surveys were also undertaken at different landing centers and fish markets.

Field Surveys

In total, forty-six field studies were undertaken in major rivers with assistance from fishermen (Haldars), who provided boats, and various types of nets and manpower. The rivers and *kharis* were divided into well-marked zones keeping in mind the flow patterns, average water depth, location of villages of local fishermen community and accessibility of the regions. Nettings were done extensively in these landing stations during three periods, namely pre-monsoon (February-May), monsoon (June-September) and post-monsoon (October-January). In case of habitat ground surveys, photographs of the area and streams in different seasons were taken.

Surveys were conducted at different markets and landing centers regularly in different seasons. Market surveys included important fish markets in big towns that are located

by the sides of major rivers of the district. Fishes were also collected from various fishermen.

Fishes were collected and immediately kept in neutral 10% Formalin in a plastic jar, and then preserved in specimen jars containing 4-6% Formalin at the Zoology Department of Balurghat College, Balurghat. The specimen jars were labelled properly and stored for further studies. Local names of the fishes were recorded on site, and size, colour and any peculiarities, if present, were noted and the fishes photographed.

Table 1: District profile

Sub-Divisions: 2	Blocks: 8	Municipalities: 2
Balurghat (District Headquarter)	Balurghat	Balurghat
Gangarampur at Buniadpur	Hili Kumarganj Tapan Gangarampur Kushmandi Banshihari Harirampur	Gangarampur

(Source: Dakshin Dinajpur District Profile URL)

Table 2: Large rivers in South Dinajpur district

Name of Major Rivers	Enters Dakshin Dinajpur at	Leaves Dakshin Dinajpur at	Blocks Traversed
Atrai	Samjia	Dangi	Kumarganj + Balurghat
Punarbhaba	Abidpur	Nababhagar (Gangarampur)	Gangarampur + Tapan
Tangan	Basudebpur	Binhari	Kushmandi + Banshihari
Jamuna	Agra	Baikunthapur	Hili

Identification of breeding grounds

Two potential habitats – Danga *Beel*, near Balurghat aerodrome, and the Gochina *Beel*, near Trimohini, Hili block – identified in the first year of survey were taken up for more studies. Another prospective breeding ground was the Bhaluka beel in the Hili block.

Making of an inventory

Collected and preserved fishes were identified using standard taxonomic procedures following standard literature (Shaw and Shebbeare 1937; Menon 1974; Jhingran 1991; Talwar and Jhingran 1991; Menon 1999; Jayaram 1999) and with the help from the Fishery Division of ZSI, Department of Zoology, Calcutta University, and Meen Bhawan, Balurghat, South Dinajpur. In total, forty-nine species have been identified.

RESULTS

We have identified 5 orders, 6 suborders, 17 families, 11 subfamilies, 40 genera and 49 fish species from the rivers, *kharis* and *beels* of the district during the two-year long survey (Table 7).

Table 3: Small rivers in South Dinajpur district

Name of Major Rivers	Enters Dakshin Dinajpur at	Leaves Dakshin Dinajpur at	Blocks Traversed
Ichhamoti	North of Thalsama	Opens to Atrai	Kumarganj
Brahmani (<i>Khari</i> like)	Comes out of Punarbhaba at Debipur	North of Lakshmipur	Gangarampur + Tapan
Tulai	Suihara	Opens to Tangan at Chandpur	Kushmandi

Table 4: List of *Khari* and *Khals* in South Dinajpur district

Name of <i>Khari/Khal</i>	Name of <i>Khari/Khal</i>
River Ghagra	Bhonar
River Cheri	Kasiani
Ghukshiri	Barakharia
Pagliganj	Kochakona
Kalkali	Harbhanga
Shyamnagar	Balia

Fishes like Bhada *Badis badis* (Hamilton-Buchanan), Nandos *Nandus nandus* (Hamilton-Buchanan) and Khursa *Labeo dero* (Hamilton-Buchanan) have not been reported from the rivers of the South Dinajpur district for the last fifteen years. We report presence of two specimens of *Badis badis*, one each from Atrai and Jamuna rivers (Table 7). Hilsa [*Hilsa (Tenuulosa) ilisha* (Hamilton-Buchanan)] earlier reported from Atrai river (local fishermen's catches) during late monsoon was not found in this study.

Another interesting find was a single specimen of *Amblyceps mangois* (Hamilton-Buchanan) (local name: Tele Tengra) from Jamuna river of Hili Block (Table 7). This fish is found usually on the pebbly beds of fast flowing rivers at the base of hills (Talwar and Jhingran 1991). Shaw and Shebbeare (1937) have also reported this fish from Jamuna river. A single specimen of *Acanthopthalmus pangia* (Hamilton-Buchanan) (local name: Pahari Puye) was collected from Jamuna river (Table 7). This fish is reported from the terai and duars area of north West Bengal (Shaw and Shebbeare 1937; Talwar and Jhingran 1991). We collected a few specimens of *Conta conta* (Hamilton-Buchanan) from Atrai river; it is usually found in the rocky streams of north West Bengal at the base of the Himalayas (Talwar and Jhingran 1991).

Waterbody-wise categorization and documentation of available fishes has been depicted in Table 7.

DISCUSSION

Over the past few years, there has been a steady and un-replenishable decline in the fish catch. A few species have become rare in the markets over the past couple of decades. This decline can be attributed to a few apparent causes: rising river beds, less precipitation and water flow, rampant use of drag nets made up of mosquito nets and degradation of the breeding grounds, in the district or probably in the upstream regions of the neighbouring country Bangladesh. There was also a possibility of the presence of polluting substances from the agricultural run-offs entering the riverine system, which contributed to the decline of fish population. In order to take measures to conserve the fish germplasm and replenish

Table 5: List of *Beels*

Name of <i>Beel</i>	Position
Danga	Between Kalkali Khari
Bhaluka	Near the international border, c. 1.5 km north of Trimohini
Gochina	Jamalpur mouza, Chagaldanga, Hili Block

the dwindling natural fish population, it is imperative that we assess the current status of the ichthyofaunal diversity of the rivers and natural water bodies of the district. Since no known published data regarding the diversity of riverine fishes of the district was available, we intended to build up the initial inventory, through a two-year long survey (2004-2006).

During this survey, we assessed the total number of fish species present in the major and minor rivers of the South Dinajpur district. A few species like *Salmostoma bacaila*, *Amblypharyngodon mola*, *Barilius barna*, *Barilius shacra*, *Esonus danricus*, *Lepidocephalus guntea*, *Botia dario*, *Danio devario*, *Mystus bleekeri*, *Mystus vittatus*, *Ailia punctata*, *Eutropiichthys murius*, *Eutropiichthys vacha*, *Xenentodon cancila*, *Chanda nama*, *Glossogobius giuris*, *Channa punctatus*, *Macrognathus pancalus* and *Mastacembelus armatus* were numerous. However, species like *Badis badis*, *Amblyceps mangois*, *Acanthophtalmus pangia*, *Conta conta*, and *Crossocheilus latius latius* were rare and only one or two specimens of each were caught.

Some of the fish species may be accidental finds in this area, like *Amblyceps*, *Acanthophtalmus* and *Conta* which are adapted to and reported from the fast flowing rivers and streams of the Himalayan foothills. Indian Torrent Catfish (*Billi Fish*) *Amblyceps mangois* (local name: *Tele Tengra*) is

Table 6: Details of resources of the district

1. Net Water Area	8,260 ha
(i) of which	
a) Culturable	2,260 ha
b) Derelict	2,603 ha
c) Semi-derelict	3,397 ha
(ii) of which	
a) Private	6,177 ha
b) Vested	1,543 ha
2. Number of persons engaged in the profession	31,265 (12,322 families)
3. Approximate annual production	9,151 tons
4. Number of Hatcheries	11 (Govt.-1, Private-10)
5. Cooperative Societies :-	
(i) Central Fishermen Coop. Societies	1
(ii) Primary Fishermen Coop. Societies	10
(iii) Membership of the Coop. Societies	3,147

(Source: Rao 2001)

distributed along the foothills of Himalayas from the Kangra Valley (Himachal Pradesh) to Assam in India and attains a length of about 12.5 cm (Talwar and Jhingran 1991). The specimen obtained by us from Jamuna river of Hili Block, is a juvenile of about 6.35 cm. *Acanthophtalmus pangia* (local name: *Pahari Puye*) is distributed in north-eastern West Bengal and Manipur, and attains a length of about 6.5 cm (Talwar and Jhingran 1991). The single specimen obtained by us from Jamuna river of Hili Block is about 5.08 cm. *Conta* Catfish or *Conta conta* (local name: unknown) is reported to be distributed at the base of Himalaya in north West Bengal, Assam and Meghalaya and attains a length of 7.8 cm (Talwar and Jhingran 1991). *Conta* Catfishes collected from Atrai river are of various sizes, attaining about 7.62 cm. Further ecological and genetical studies are needed to compare these species with those found in the northern regions and to explore the possibility of their adaptive radiation.

Table 7: River-wise categorization of fish catch

Species	Atrai	Punarbhaba	Tangon	Jamuna
Class Osteichthyes				
Subclass Actinopterygii				
Subdivision Teleostei				
Order Cypriniformes				
Family Cyprinidae				
Subfamily Cyprininae				
1. <i>Catla catla</i> (Hamilton-Buchanan)	+	+	+	+
2. <i>Cirrhinus mrigala</i> (Hamilton-Buchanan)	+	+	+	+
3. <i>Cirrhinus reba</i> (Hamilton-Buchanan)	+	+	-	+
4. <i>Labeo bata</i> (Hamilton-Buchanan)	+	+	+	+
5. <i>Labeo calbasu</i> (Hamilton-Buchanan)	+	+	+	+
6. <i>Labeo rohita</i> (Hamilton-Buchanan)	+	+	+	+
7. <i>Puntius conchoni</i> (Hamilton-Buchanan)	+	+	+	+
8. <i>Puntius sarana sarana</i> (Hamilton-Buchanan)	+	+	+	+
9. <i>Puntius sophore</i> (Hamilton-Buchanan)	+	+	+	+
10. <i>Puntius ticto</i> (Hamilton-Buchanan)	+	-	-	-

Table 7: River-wise categorization of fish catch (contd.)

Species	Atrai	Punarbhaba	Tangon	Jamuna
Subfamily Cultrinae				
11. <i>Salmostoma bacaila</i> (Hamilton-Buchanan)	+	+	+	+
Subfamily Rasborinae				
12. <i>Amblypharyngodon mola</i> (Hamilton-Buchanan)	+	+	+	+
13. <i>Aspidoparia morar</i> (Hamilton-Buchanan)	+	+	-	-
14. <i>Barilius barna</i> (Hamilton-Buchanan)	+	+	+	+
15. <i>Barilius shacra</i> (Hamilton-Buchanan)	+	+	+	+
16. <i>Danio devario</i> (Hamilton-Buchanan)	+	+	+	+
17. <i>Esomus danricus</i> (Hamilton-Buchanan)	+	+	+	+
Subfamily Garrinae				
18. <i>Crossocheilus latius latius</i> (Hamilton-Buchanan)	-	-	-	+
Family Psilorhynchidae				
19. <i>Psilorhynchus sucatio</i> (Hamilton-Buchanan)	+	+	+	+
Family Cobitidae				
Subfamily Cobitinae				
20. <i>Lepidocephalus guntea</i> (Hamilton-Buchanan)	+	+	-	+
21. <i>Acanthopthalmus pangia</i> (Hamilton-Buchanan)	-	-	-	+
22. <i>Somileptus gongota</i> (Hamilton-Buchanan)	+	+	+	+
Subfamily Botiinae				
23. <i>Botia dario</i> (Hamilton-Buchanan)	+	+	-	+
Order 2 Siluriformes				
Family Bagridae				
24. <i>Mystus bleekeri</i> (Day)	+	+	+	+
25. <i>Mystus vittatus</i> (Bloch)	+	+	+	+
26. <i>Rita rita</i> (Hamilton-Buchanan)	+	+	+	+
Family Siluridae				
27. <i>Ompok pabda</i> (Hamilton-Buchanan)	+	+	+	+
28. <i>Wallago attu</i> (Schneider)	+	+	+	+
Subfamily Ailiinae				
29. <i>Ailia punctata</i> (Day)	+	+	-	-
Subfamily Schilbeinae				
30. <i>Clupisoma garua</i> (Hamilton-Buchanan)	+	+	+	+
31. <i>Eutropiichthys murius</i> (Hamilton-Buchanan)	+	+	-	-
32. <i>Eutropiichthys vacha</i> (Hamilton-Buchanan)	+	+	-	-
Family Pangasiidae				
33. <i>Pangasius pangasius</i> (Hamilton-Buchanan)	+	+	+	+
34. <i>Amblyceps mangois</i> (Hamilton-Buchanan)	-	-	-	+
Family Sisoridae				
35. <i>Conta conta</i> (Hamilton-Buchanan)	+	-	-	-
36. <i>Erethistes pussilus</i> Muller & Troschel	+	-	-	-
37. <i>Erethistoides montana montana</i> Hora	+	-	-	-
38. <i>Sisor rhabdophorus</i> Hamilton-Buchanan	+	-	-	+
Family Clariidae				
39. <i>Clarias batrachus</i> (Linnaeus)	+	+	+	+

Table 7: River-wise categorization of fish catch (*contd.*)

Species	Atrai	Punarbhaba	Tangon	Jamuna
Order Cyprinodontiformes				
Suborder Exocoetoidei				
Family Belontiidae				
40. <i>Xenentodon cancila</i> (Hamilton-Buchanan)	+	+	+	+
Order Perciformes				
Suborder Percoidei				
Family Chandidae				
41. <i>Chanda nama</i> Hamilton-Buchanan	+	+	+	+
Family Nandidae				
Subfamily Badinae				
42. <i>Badis badis</i> (Hamilton-Buchanan)	+	-	-	+
Suborder Gobioidae				
Family Gobiidae				
Subfamily Gobiinae				
43. <i>Glossogobius giuris</i> (Hamilton-Buchanan)	+	+	-	+
Suborder Anabantoidae				
Family Anabantidae				
44. <i>Anabas testudineus</i> (Bloch)	+	+	+	+
Family Belontiidae				
Subfamily Trichogasterinae				
45. <i>Colisa fasciatus</i> (Schneider)	+	+	+	+
Suborder Channoidei				
Family Channidae				
46. <i>Channa punctatus</i> (Bloch)	+	+	+	+
Suborder Mastacembeloidei				
Family Mastacembelidae				
47. <i>Macrognathus pancalus</i> Hamilton-Buchanan	+	+	+	+
48. <i>Mastacembelus armatus</i> (Lacepede)	+	+	+	+
Order Tetraodontiformes				
Family Tetraodontidae				
49. <i>Tetraodon cutcutia</i> Hamilton-Buchanan	+	+	-	+
Total Fish Species	46	40	31	41
(+: Found; (-): Not Found)				

In the habitat ground surveys, we have found numerous small hatchlings and fries of minor carps, spiny eels, snake heads, gobies and perches during the early monsoon. Prospective breeding ground, like Danga *beel* remains almost dry during the dry periods with only a thin stream (Kalkali *Khari*) flowing through it. The area is used for cultivation during this period, which often gets over flooded during monsoon. The fish fries are carried along the *khari* that opens to Atrai river at Balurghat town. The habitat survey with regards to physico-chemical parameters and water quality assessment vis-à-vis fish species availability will be published later.

ACKNOWLEDGEMENTS

This study was financially supported by the University Grants Commission Minor Research Project [MRP No. F. PSW-069/03-04 (ERO)] awarded to the corresponding author (Principal Investigator) at the Department of Zoology, Balurghat College (Govt. Sponsored), South Dinajpur. The authors also acknowledge the help extended by the Principal, Balurghat College, Assistant Director of Fisheries, Dakshin Dinajpur, Balurghat and Zoological Survey of India, Fishery Division, Kolkata.

REFERENCES

- ANON (1992-1993): National Bureau of Fish Genetic Resources, Annual Report, pp. 65.
- DAS, P. (1994): Strategies for conserving threatened fishes. Pp. 307-310. *In*: Dehadrai, P.V., P. Das & S.R. Verma (Eds): Threatened fishes of India. Natcon Pub. No. 4, Muzaffernagar.
- JAYARAM, K.C. (1999): The Freshwater Fishes of the Indian Region. Narendra Publishing House, pp. xxvii + 551, Narendra Publishing House, New Delhi.
- JHINGRAN, V.G. (1991): Fish and Fisheries of India. Hindustan Publishing Company, New Delhi, pp. 727.
- MENON, A.G.K. (1974): A Checklist of the Fishes of the Himalayan and Indo-Gangetic Plains. Inland Fish. Soc. India (Barrackpore), pp. viii + 136.
- MENON, A.G.K. (1999): Freshwater Fishes of India. Occasional Paper No. 175, Zoological Survey of India, Calcutta, pp. xxix + 366.
- RAO, T.R.K. (2001): Potential Linked Credit Plan, 2002-2003 to 2006-2007, with detailed Projections for 2002-2003. National Bank for Agriculture and Rural Development (NABARD), Kolkata.
- SHAW, G.E. & E.O. SHEBBEARE (1937): The fishes of north Bengal. *Journal of Royal Asiatic Society of Bengal, Science* 3: 1-137.
- SINHA, M. (1998): Impact of environment on fish germplasm. Pp. 1-11. *In*: Ponniah, A.G, P. Das & S.R. Verma (Eds): Fish Genetics and Biodiversity Conservation. Natcon Pub. No. 5, Muzaffernagar.
- TALWAR, P.K. & A.G. JHINGRAN (1991): Inland Fishes of India and Adjacent countries. Pp. xix + 1158, Vol. I & II, Oxford and IBH Co. Pvt. Ltd. (New Delhi).

■ ■ ■